Newsletter

Center for

GeoHazards Studies

Spring 2014

Letter from the Director

Hello Friends and Colleagues:

In this issue of the Center for Geohazards Studies Newsletter we highlight some of the recent activities and research projects being conducted by Center members:

* Greenland ice sheet retreat, by Dr. Beata Csatho (Geology) illustrates some of the interesting work being done to characterize responses of ice sheets that can then provide information on the potential impacts of climate change. The Center Advisory Group is exploring ways to expand our work on geological hazards that are related to changing climates, including potential increases (or decreases) in the frequency and severity of mass movements, floods, and their impacts.

* Volcanic hazards modeling tools, work summarized by Dr. Abani Patra (Mechanical and Aerospace Engineering), are being enhanced in order to make them more adaptable to specific problems and new solution techniques. This work builds on the VHub cyberinfrastructure project which has been coordinated by the Center since its inception in 2010.

* Volcanic crisis awareness training, reported by Dr. Alison Graettinger (Geology), was an opportunity for students and researchers to strengthen their background in the science and decision-making processes associated with volcanic eruptions as they unfold.

The Center is heading into a busy summer. A new series of blast experiments, simulating the dynamics of volcanic craters and their subsurface structures, will take place in June, with collaborators from several countries participating. A new laboratory setup is being built by Dr. Ingo Sonder to explore the effects of geologic material properties on the interface between hot rocks and liquid water. This is a prelude to large-scale experiments on the mixing of magma and water and subsequent explosion dynamics. Additional efforts are plugging the Center into broader UB strategic planning initiatives.

We hope the Newsletter is informative for you and thank you for your interest in geohazards!

Greg Valentine, Director

Special points of interest:

STUDENTS:

Interested in becoming more involved?

E-mail Andrew Harp at agharp@buffalo.edu to learn about the student committee.

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Research Updates

NASA/ Measuring Elevation Changes on the Greenland Ice Sheet By Dr. Beata Csatho

The Greenland Ice Sheet is at the center of attention of scientists and the mainstream media alike. Despite its potential to contribute dramatically to sea level rise in response to ongoing and projected climate change, resulting in significant socio-economic impacts in the US and around the globe, the future behavior of the Greenland Ice Sheet remains largely uncertain. This uncertainty stems from the incomplete knowledge of the pattern and timescales of the ice sheet's response to climate change. Satellite laser altimetry data from the Ice Cloud and land Elevation Satellite (ICESat) mission, combined with airborne laser altimetry, provide accurate measurements of surface elevation changes. Together with surface velocities, derived from various satellite platforms, crucial information on changing glacier dynamics is obtained. This diverse data set allows for characterizing the spatial and temporal evolution of ice sheets and outlet glaciers. Using laser altimetry data and a novel approach called Surface Elevation Reconstruction And Change detection (SERAC), a team of UB faculty and students, led by Drs. Beata Csatho and Anton Schenk, generated the first detailed reconstruction of Greenland Ice Sheet elevation changes in 2003-2012. Team members include UB students Greg Babonis, Kyle Duncan and Soroush Rezvanbehbahani (now a PhD student at the University of Kansas) and postdoctoral researcher Sudhagar Nagarajan (now an Assistant Professor at Florida Atlantic University). NASA's visualization studio combined the elevation change record with other data sets depicting subglacial topography and ice velocity to create a spectacular animation of the Greenland Ice Sheet: http://svs.gsfc.nasa.gov/vis/a000000/a004000/a004022/



Thinning of the Greenland Ice Sheet along the west Greenland Ice Sheet margin (green, blue and purple colors). Arrow points to Jakobshavn Isbræ, one of the fastest flowing glaciers in the world, which has been steadily thinning since the late 1990s.

Research Update continues

New Center for Geohazards Studies Effort: Building Sustainable Tools and Collaboration for Volcanic and Related Hazards By Dr. Abani Patra



The Center for GeoHazards Studies and its predecessors have been pioneers in provisioning cyberinfrastructure and tools for analysis of volcanic hazards. Together with University of South Florida and University of Alaska at Fairbanks, we were recently awarded a new project focused on creating and upgrading software infrastructure that will allow effective analysis of many volcano related hazards. Specifically, the project will reengineer three widely used tools (TITAN2D – block and ash flows, TEPHRA and Puff – ash transport and dispersal) and develop support for workflows that use these tools to analyze risk from volcanic hazards. Reengineering will encompass modularization so researcher's may easily experiment with different modeling approaches, incorporation of techniques to make the tools efficient on new computing architectures like GPUs and many core chips. The workflows are intended to tackle the challenges of managing complex and often large data flows associated with these tools in validation processes and in probabilistic inference based on the outcomes of the modeling. The tools and workflows will be made available using the popular vhub.org platform. Investment in this SSI will help provide a standard well managed hardware/software platform and approaches to standardize the documentation associated with input data, source code, and output data. This will ensure that model calculations are reproducible.

The wider use of these high fidelity tools and their use in mitigating hazard is likely to have a significant effect on hazard analysis and management. Project will also engage in several major workshops and in training activities. Project personnel will also engage in the Earthcube initiative – popularizing computational methodologies, online access and dissemination mechanisms through the VHub platform.

The effort will be led by PI A. Patra and will engage CGHS participants G. Valentine, M. Bursik, C. Renschler, S. M. Gallo, M. Jones and computer scientist T. Kosar. From USF C. Connor, L. Connor and S. Charbonnier and from UAF P. Webley round out the team.

Upcoming Conference

Tephra 2014 Maximizing the potential of tephra for multidisciplinary science 3-7 August 2014 Portland, Oregon, USA



3-7 August 2014 Portland, Oregon, USA + Tephra in multidisciplinary selence

This workshop will discuss major developments, best practices, and future directions/needs in tephra studies from both volcanological and tephrochronological perspectives. By bringing together a broad array of scientists who study tephra for different purposes, we intend to enhance interdisciplinary collaboration and data sharing.

Please click on the link below for more information.

http://www.geohazards.buffalo.edu/documents/Tephra2014.shtml

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FEMA Class "Volcano Crisis Awareness"

by Alison Graettinger (Center for GeoHazards Studies)

For two days in February the Center for Geohazard Studies co-hosted a workshop on Volcano Crisis Awareness with the National Domestic Preparedness Training Center (NDPTC). The course covered modules on volcanic hazards, case studies, and public awareness/preparedness. On the second day participants engaged in an eruption scenario where they enacted roles in the local government and public services that would be involved in such an event. Work groups included transportation, first responders, health and safety, and city/county government managers. The exercise was very animated with many important conversations about immediate and long term crisis response and responsibilities. Participants in the course represented three universities and four disciplines. The scenario was an excellent opportunity for academic scientists to appreciate the other important roles of eruption crisis mitigation and management. The course was run by Bruce Houghton and Kristine Kosinski from the University of Hawaii at Manoa.

For information on how to host a course please contact K.Kosinski @ kkosinsk@hawaii.edu



Above: Participants were separated into groups to work on their assigned case study

Azufral Volcano, Colombia



Graduate students (left to right) Matt Williams, Peter Johnson, and Andrew Harp with Greg Valentine in the crater of Azufral Volcano, Colombia.

The Center for GeoHazards Studies

UNIVERSITY AT BUFFALO

Center for GeoHazards Studies University at Buffalo, SUNY 411 Cooke Hall Buffalo, NY 14260-3050

Phone: 716-645-6366 Fax: 716-645-3999 E-mail: geohaz@buffalo.edu



GeoHazards Studies

Have changes to your employment, research interests, or contact information? Let us know at

geohaz@buffalo.edu.

The *Center for GeoHazards Studies* seeks to decrease harmful societal effects of natural phenomena such as volcanic eruptions, landslides, mudflows, and avalanches through research, service, and education. Our team of scientists and engineers works together with social scientists, urban planners and public health researchers to evaluate the broader harmful impact of hazardous natural phenomena. One of our principal goals is to integrate analyses of various hazards with predictions of their effects on human infrastructure and ecosystems in order to evaluate approaches that could lead to a reduction of injury and death. Hazards that are affected or triggered by changes in climate are included within the Center's scope.

Special thanks to:

Advisory Committee Members:

Marcus Bursik, University at Buffalo Beata Csatho, University at Buffalo Alison Graettinger, University at Buffalo Abani Patra, University at Buffalo Chris Renschler, University at Buffalo Adel Sadek, University at Buffalo Michael Sheridan, University at Buffalo Ingo Sonder, University at Buffalo Andrew Whittaker, University at Buffalo Janet Yang, University at Buffalo Jun Zhuang, University at Buffalo

Student Representative: Andrew Harp, University at Buffalo

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Send your research updates to Barb Catalano (bac6@buffalo.edu) to be included in the next newsletter or eblast!

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